SEMINAR NOTICE

1. Title: Use cases of big data and deep learning for large-scale biomedical applications using supercomputers

2. Name and Affiliation:
   Dr. Seung-Jong (Jay) Park, School of EECS, Louisiana State University, U.S.A.

3. Date, Time and Venue : 2019.10.23. Wednesday 16:00 ~ , IT-5 Bldg, Room 324

4. Target Audience: KNU Professors, Graduate students

5. Organization, Sponsored by:
   BK21+ SW Human Resource Development Program for Supporting Smart Life
   Massively Parallel Computing lab (Director Nakhoon Baek)

ABSTRACT:

Research computing has supported traditional compute intensive research projects with High Performance Computing (HPC) resources and High Speed Networks. Due to recent development of big data and deep learning technologies, scientists are increasingly using the current state of the art big data analytic technologies (e.g., Hadoop, etc.) and deep learning technologies for their data-intensive scientific applications over HPC environment.

This talk will discuss about the balanced cyberinfrastructure consisting of hardware and software environment for the big data and deep learning applications. And two examples will be presented as use-cases. The talk presents a use-case of Deep Learning to the automated detection and diagnosis of breast cancer using mammogram images using advanced deep learning techniques and then demonstrates the effectiveness of the proposed method on detection of suspicious areas and further diagnosis as benign or malignant compared to related works. And the second use-case will be presented in the area of whole genome sequence assembly using HPC resources. The talk will discuss about a distributed assembler that achieves both scalability and memory efficiency by using partitioned de Bruijn graphs, enhancing the memory-to-disk swapping, and reducing the network communication in the HPC cluster.

BIOGRAPHY:

Dr. Seung-Jong (Jay) Park is the Dr. Fred H. Fenn Memorial Professor of the School of Electrical Engineering & Computer Science and jointly appointed with the Center for Computation Technology at Louisiana State University. He received his Ph.D. from The School of Electrical and Computer Engineering at Georgia Institute of Technology, 2004. He has performed interdisciplinary research projects including (1) big data & deep learning research including developing software frameworks for large-scale science applications and (2) cyberinfrastructure development using cloud computing and high-performance computing. Those projects have been supported by federal and state funding programs including NSF CC-NIE, NSF MRI, NSF IBSS, NSF GENI, NASA Geohealth, NIH LBRN programs, etc. He has published more than 70 papers in major journals and conferences (e.g., IEEE Tran. on Mobile Computing, ACM MobiHoc, IEEE Bigdata, IEEE BIBM, IEEE IPDPS, IEEE ICDCS, ACM BCB, MICCAI, IEEE Cloud, IEEE ICPADS, IEEE ICCCN, IEEE LCN, IEEE ICC, IEEE Globecom, EDBT/ICDT, etc.)

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